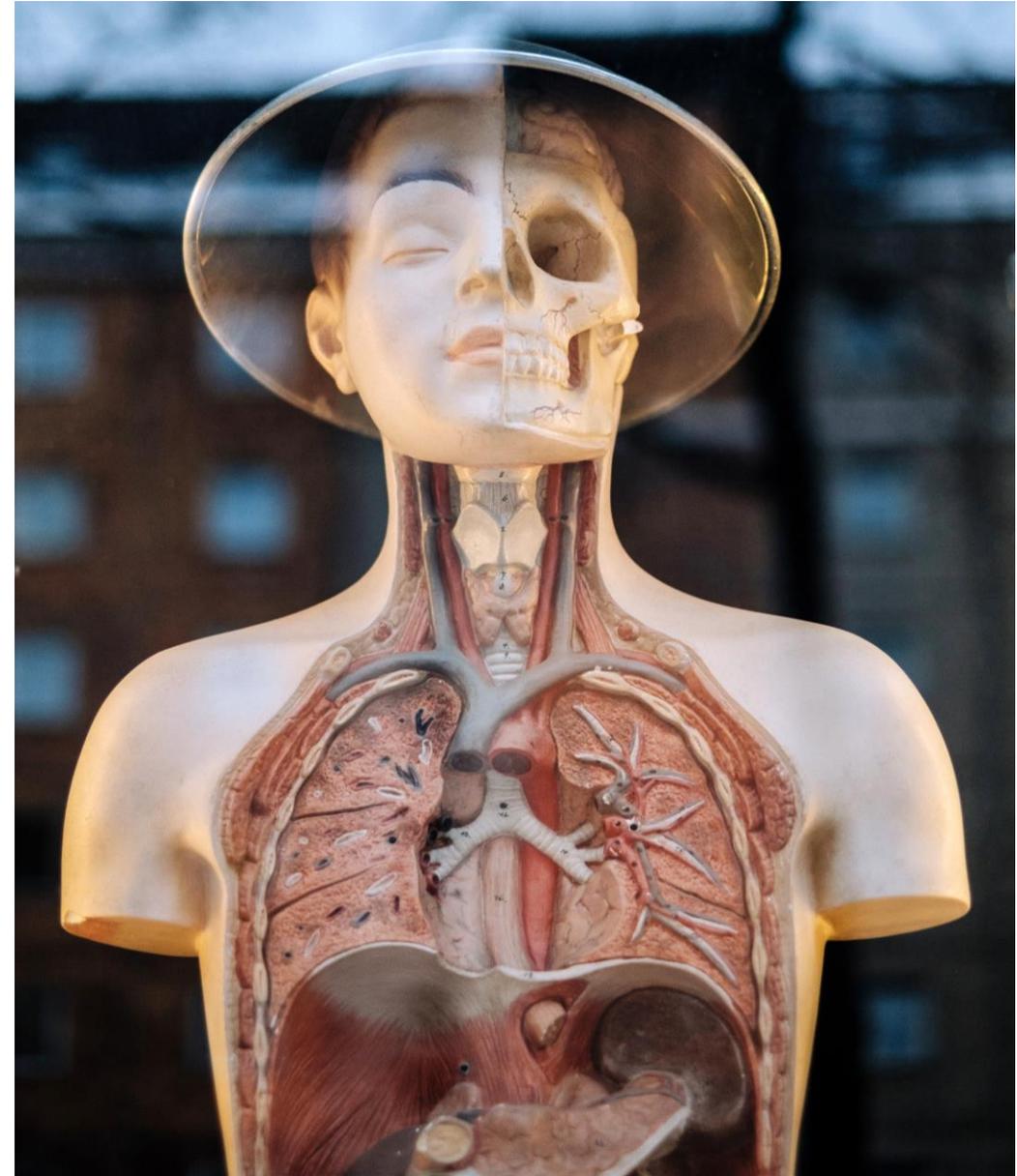


Access to lung cancer screening services

Preliminary analysis of geographic service distribution using the ACR Lung Cancer Screening Registry



Authors

- Paniz Charkhchi, MD
- Ruth Carlos, MD, MS, FACR

Affiliation:

Department of Radiology,
University of Michigan School of Medicine

Importance of the issue

- Number of new cases of lung cancer is 57.3 per 100,000 men and women per year. (based on 2009-2013 cases)
- Lung cancer has the highest mortality, 46 per 100,000 men and women per year.
- The Centers for Medicare and Medicaid Services (CMS) ruled that individuals insured by Medicare who are 55-77 years old, asymptomatic, current smoker or have quit smoking within the last 15 year, tobacco smoking history of at least 30 pack years will be covered for LDCT without any out of pocket cost .
- Currently, the only CMS approved lung cancer screening registry is the Lung Cancer Screening Registry (LCSR) administered by the American College of Radiology (ACR).

Importance of the issue

- Direct financial barriers for lung cancer screening have been reduced.
- But beyond direct financial barriers to preventive services, barriers to access may be geographic, temporal, socioeconomic or educational.
- Geographic access to services including proximity of at-risk populations to screening facilities represent a potential barrier.

Objectives

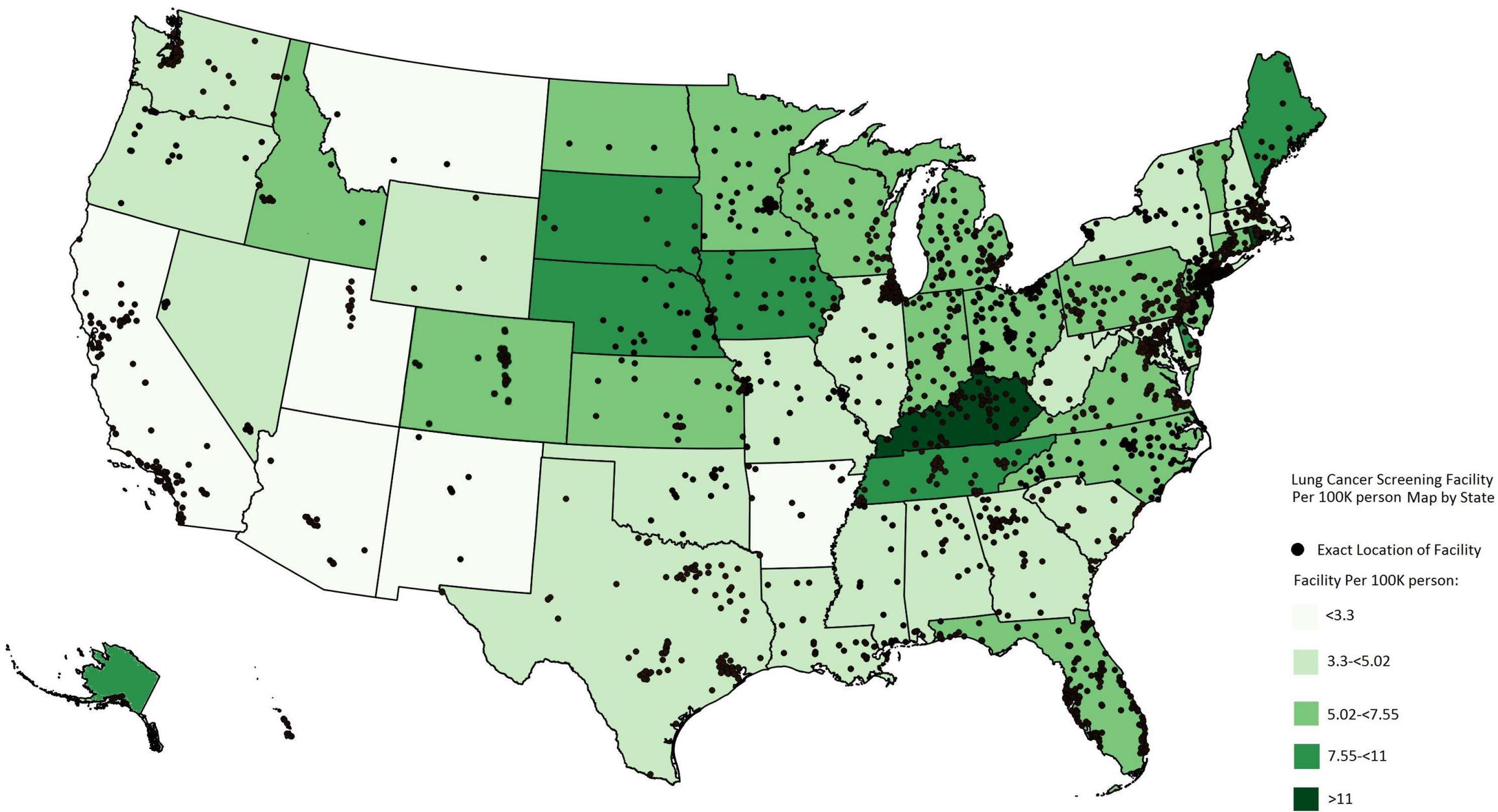
- We aim to show the availability of lung cancer screening facilities in the each state to provide screening services to those who are age-eligible to be insured by Medicare.
- Assess if facility availability is proportionate to smoking prevalence in each state.

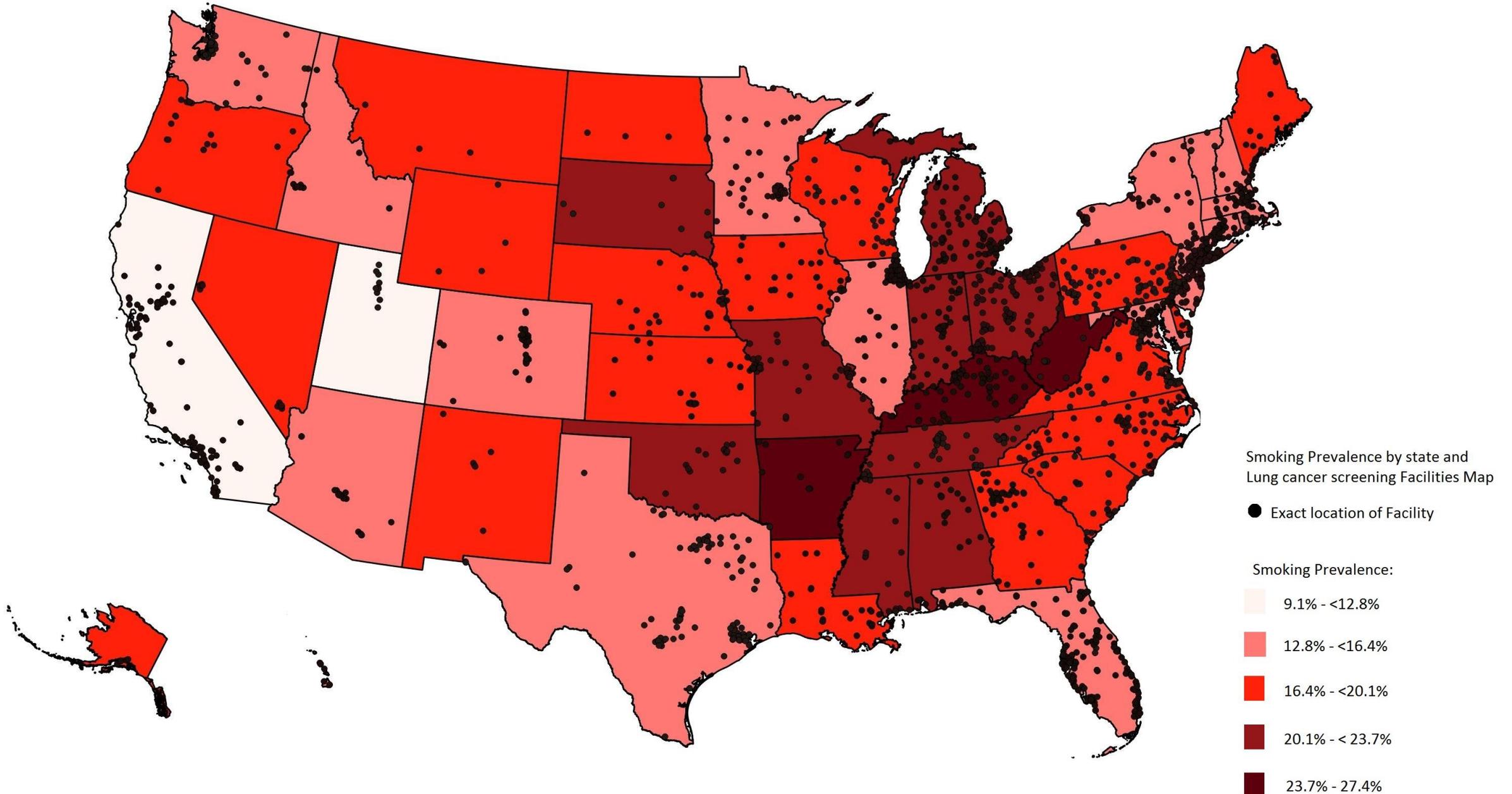
Method

- The publicly available list of screening facilities participating in the LCSR was accessed on November 18th, 2016 and was used as a proxy for the availability of lung cancer screening facilities in each state.
- State specific smoking prevalence in 2015 was obtained from Centers for Disease Control and Prevention (CDC).
- For each state, we estimated the population eligible to be insured under Medicare as the number of individuals aged 65 years old and above as of July 1, 2015 from the United States Census Bureau.
- To assess the independent state-level relationship between smoking prevalence and Medicare insured with number of screening facilities, Pearson's correlation coefficient was calculated, Using Stata 11 (StataCorp LLC, College Station, TX).
- The location and distribution of screening facilities by state were graphically represented using QGIS 2.18, open-source geographic information system (GIS) application that provides data viewing and analysis.

Result

- 2,423 facilities participated in the LCSR, with a median number of 32 facilities per state (IQR range= 63) with highest number in the Florida (n=198) and the lowest number in the District of Columbia and Montana (n=3).
- The median number of facilities per 100,000 persons aged 65 years and above was 5 (IQR range= 3) with the highest number of facilities per 100,000 estimated Medicare insured in the Kentucky (n=12) and lowest in the Montana (n=2).
- State-level availability of lung cancer screening facilities positively correlated with the estimated Medicare insured population, ($r = 0.83$, $p\text{-value} < 0.01$) while no correlation between availability of lung cancer screening facilities and smoking rates ($r = 0.19$, $p\text{-value} = 0.18$) were observed.





Discussion

- The frequency of screening facilities were not associated with smoking prevalence within in each state; however, we demonstrated that state-level availability of lung cancer screening facilities across the Unites States correlated with the estimated number of individuals eligible for Medicare.
- We have highlighted the relationship of lung cancer screening service availability to the potential at-risk population served by Medicare, an insurer that requires participation in a CMS approved LCSR in order for the service to be covered and the provider to be reimbursed.

Discussion

- Equitable and efficient use of proven preventive services requires reduction of a host of barriers to access.
- Out of pocket cost has been eliminated through ACA; however, geographic barrier may represent as barrier in access to care specially where smoking is more prevalent.
- Smoking trends continue to shift from cities, where most facilities are located, to rural areas, increasing the challenge of optimizing screening facility distribution. Changes in smoking prevalence raise the need for further investigation on how should resources be allocated geographically

Discussion

- Having geographic access to the facility alone insufficiently guarantees access to screening. Full implementation of lung cancer screening requires increasing screening capacity per facility, particularly in areas with currently constrained care delivery.
- Smieliauskas estimated that lung cancer screening implementation would increase imaging procedures by 4% across the U.S., representing a significant workforce issue and likely to result in disparities to access lung cancer screening. Manpower constraints can limit temporal service availability with office closures and limited hours.

limitation and conclusion

- Inability to precisely define the distribution of the population considered at risk, particularly of those with the risk profile specified by the USPSTF and Medicare as eligible for LDCT coverage, current smokers or those who have recently quit within the last 15 years and have at least a 30 pack year smoking history.
- We may underestimate the variation as we demonstrate distribution of the facilities at state level rather than county level.
- The effect of this potential mismatch in distribution in lung cancer screening facilities across the United States on lung cancer related mortality is unclear and requires further investigation